



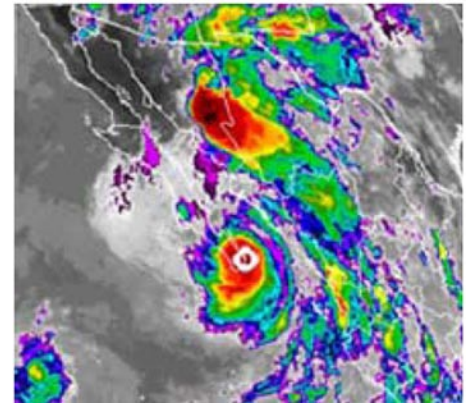
## INTER-AMERICAN INSTITUTE FOR GLOBAL CHANGE RESEARCH

### Tropical cyclones: current characteristics and potential changes under a warmer climate (CRN2048)

The Eastern Pacific has the highest density of cyclones worldwide, and upon landfall they often produce catastrophic rains, flooding and landslides. The Mexican Meteorological Service and the US National Hurricane Center (NHC) issue forecasts of track and intensity for tropical cyclones, which help emergency managers, prepare warnings for the public. Accuracy and reliability need to be improved for effective disaster prevention and this project seeks to identify model and data needs for improved forecasts.

#### Goals

- Improve the understanding of tropical cyclone intensification and evolution in the East Pacific through observations and model simulations, and identify potential global warming effects on cyclones
- Provide training of graduate students, particularly in Latin America
- Develop recommendations to improve the ability of Weather Services to forecast tropical cyclones



GOES IR image of John 2 September 2006

#### First results

- Results provide evidence of the role played by atmospheric circulations as important determinants of storm tracks and rainfall over the region. Cyclone intensity depends on mass and energy budgets in the atmosphere and how they interact with the ocean...Circulation speed increases a cyclone's (destructive) energy; surface friction decreases it.
- The study of three tropical cyclones that made landfall over northwestern Mexico showed that "external" factors such as the inflow of warm dry air from the western United States need to be understood for better track prediction in the Eastern Pacific.
- The project has started to build a data base of historical records using newspaper articles and government reports and that has allowed to identify and document past cyclones that made landfall over the Mexican Pacific States.
- Over 100 students were trained in three successful courses on the theory and practice of identification and evolution of tropical cyclones.
- First results have improved the team's knowledge of cyclone evolution. They have also shown that hurricane science needs to be further developed.
- Regional-level climate studies and data collection need to be expanded to accurately assess regional risks.

#### Principal investigator and lead agency

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#### Links to other IAI projects

This project collaborates with the *Small Grants Projects for the Human Dimension* **Information flows and policy: Use of climate diagnostics and cyclone prediction for adaptive water-resources management under climatic uncertainty in western North America** (SGP-HD005) and the *Collaborative Research Network Project* **Paleotempestology of the Caribbean Region: A Multi-proxy, Multi-site Study of the Spatial and Temporal Variability of Caribbean Hurricane Activity** (CRN 2050).

**Project web page:** <http://cabernet.atmosfcu.unam.mx/IAI>

**List of publications:** <http://cabernet.atmosfcu.unam.mx/IAI/publications.html> or <http://iaibr.l.iai.int/bs/publications/CRN2048.pdf>

